

Appl. No. 09/649,528
Amdt. Dated 10 August 2005
Reply to Office action of 31 May 2005

REMARKS/ARGUMENTS

Reexamination and reconsideration of this application as amended is requested. Claims 1, 8, 10, 11, 16, and 18 remain in the application.

REJECTION OF CLAIMS 1, 8, 10, 11, 16, AND 18 UNDER 35 U.S.C. §102

Claims 1, 8, 10, 11, 16, and 18 have been rejected under 35 U.S.C. 102 as being anticipated by Furuya et al. (JP06-111838).

The Examiner's detailed comments and description of the cited Furuya reference are well taken, with one major exception. It is not believed that Furuya discloses an integral, sintered, monolithic ceramic carrier as asserted by the Examiner.

The Examiner has directed our attention to FIG. 7; however, FIG. 7 only shows layers of a material. In section [0034] of Furuya, it is mentioned in several locations that the plates, e.g., 22 and 23, are laminated (see page 24/68, lines 5-10, 20-24, and especially at lines 25-28 where it refers to a lamination structure). When the plates are laminated, the apparatus is not an integrated, sintered, monolithic structure (see advantages listed below).

The Examiner has also directed our attention to plates 1, 2 as comprising materials having high thermal conductivity, including sintered ceramic. However, even if the material used is ceramic, Furuya does not teach an integrated, sintered, monolithic structure. In section [0034] of Furuya it discusses plates 1, 2 as being laminated (line 2).

The Examiner has additionally directed our attention to sections [0017], and [0030]-[0033]. However, those sections are teaching the making of a porous bed for the catalyst that is positioned on a layer of the structure (which may be metal for example). The porous bed material is heated, or sintered. These sections are believed to be the only location in Furuya (as translated) that the word "sintered" is used, and it relates to the making of the porous bed, not the layered structure.

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The Applicant asserts that Furuya discloses a reactor built using discrete pieces of materials to form the plates, with catalyst deposited on them prior to sealing into a packaged assembly. Furuya utilizes discrete pieces to assemble the unit, which according to section [0010], includes the "laminating of two or more plates". The Applicant asserts that throughout the disclosure of Furuya it is stated that these discrete pieces are simply "laminated". The Applicant asserts that paragraph [0030]-[0033] as referred to by the Examiner, describes the sintering of a catalyst support layer within a formed channel, to the plate itself. The disclosure fails to disclose the sintering of the plurality of components that make up the final assembly.

The Applicant asserts that Furuya discloses a very cumbersome method of making the reformer unit that is comprised of discrete layers that are simply packaged together. The end result is not sintered as is the device claimed by the Applicant. The Applicant asserts that the system of Furuya uses discrete pieces of metal or ceramic and joins them together subsequent to the fabrication of channels having a catalyst disposed therein. The channels are formed in the plate and then the catalyst material is deposited, prior to the plates being laminated together to form the structure. The Applicant asserts that the reforming catalyst is a low temperature catalyst and will oxidize at high temperatures (i.e. the Applicant sintering temperature). Accordingly, the Applicant asserts that the structure of Furuya is not "a sintered, monolithic structure" as claimed by the Applicant, and that the disclosure actually teaches away from the sintering of the plurality of layers in that the reforming catalyst is included prior to assembly. The disclosure of Furuya states the use of glass sealing, or the like, to join the different plates (ceramic, silicon) together. As stated in paragraph [0059] of Furuya, "as shown in drawing 1, the laminating of the plate 1 and plate 2 which were obtained by the above-mentioned method was carried out by turns one by one, sheathing was twisted with glass wool and aluminum foil, and the reforming machine was obtained". Accordingly, the Applicant asserts that the assembly of Furuya is not sintered in the manner of the Applicant's device. Additionally, some similar type of brazing is utilized for the laminating of metal pieces in Furuya. The Applicant asserts that due to the simple laminating procedure of these discrete pieces, the device remains susceptible to leakage of gas, liquid, etc.

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In contrast, the Applicant discloses forming the structures in the green state using multilayer ceramic technology so that subsequent to sintering, a monolithic structure is formed. The Applicant asserts that this type of monolithic structure eliminates any leakage of gas, or liquid that flows through the structure. In addition, this method of forming the device out of green sheets with subsequent sintering of the multiple layers provides for ease and accuracy in alignment of the channels formed therein, due to ceramic alignment during processing.

The Applicant does not provide for the catalyst inclusion prior to sintering and forming a monolithic unit. In the Applicant's device, a reforming section cavity is formed during processing, and later is filled with a catalyst powder for reforming. Most steam reforming catalysts are base metal catalysts and they are difficult to deposit and process along with the fuel processor structure in that they tend to become oxidized and lose their catalytic activity. The Applicant's process provides for the filling of the reforming catalyst powder into the reforming section cavity after sintering of the structure, and subsequent sealing it. In addition, the wall coating is disclosed by the Applicant differs from the wall coating of Furuya in that the Applicant discloses wall coating subsequent to sintering of the multiple layers.

Accordingly, the Applicant asserts that Furuya fails to disclose a sintered monolithic structure such as included within independent claims 1, 11 and 18 of the Applicant's claimed device. Each of the independent claims 1, 11, and 18 include the limitation "an integral, sintered, monolithic ceramic carrier" or "integral, sintered, monolithic multilayer ceramic carrier structure". Therefore the Applicant asserts that claims 1, 11 and 18 are in a condition for allowance. The Applicant additionally asserts that claims 8, 10, and 16 are also in a condition for allowance in that they depend from claims 1, 11, and 18, respectively, and for the additional limitations they add.

Accordingly, it is believed that the rejection of claims 1, 8, 10, 11, 16, and 18 under 35 U.S.C. 102 has been overcome by the amendment and remarks.

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CONCLUSION

The remaining cited references have been reviewed and are not believed to affect the patentability of the claims as amended.

No amendment made herein was related to the statutory requirements of patentability unless expressly stated; and no amendment made herein was for the purpose of narrowing the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's rejections have been overcome. Accordingly, Applicants respectfully submit that the application, as amended, is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this application, Applicants request that the Examiner contact the Applicants attorneys at 480-385-5060.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 502,091 for any fee which may be due.

Respectfully submitted,

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